

REMARKS

The non-elected claims have been cancelled without prejudice to Applicants' right to file an appropriate continuing application directed thereto.

A series of new claims have been added for consideration by the Examiner. These claims find basis in the claims already under consideration, the paragraph bridging claims 4 and 5 of the application and in the working examples.

Claims 1-3 were rejected under 35 USC 102 over Kou, and claim 4 was rejected under 35 USC 103 over Kou in view of Cordova-Plaza or Kobayashi. These rejections are respectfully traversed.

When single crystals are grown without using a seed crystal, the crystals grow in the same way as their nuclei which are naturally generated and function as the seed crystals and accordingly, the crystals have random orientations. Because the physical properties of the materials are dependent on their crystal orientations, it is important to grow crystals so as to have their intended orientation and this generally requires using a seed crystal in the method. The use of such seed crystals makes the production process complicated.

The inventors of the present invention determined that when a fiber-shaped single crystal is 3 mm or less in diameter, the densest surface produced is in the free surface normal to the growth direction of the crystals, even if a seed crystal is employed. This permits orientation of growth of the crystals to be controlled.

The Kou patent relates to an edge defined contact heater apparatus for use in a floating zone crystal growth method. The method in this reference does not, however, either teach or suggest that the fiber-shaped single crystal be 3 mm or smaller in diameter.

The Office Action assumes that since the shaper disclosed in Kou has small holes, a fiber-shaped crystal of 3 mm or less in diameter must be produced. This presumption is not correct. Kou's shaper 40 has an edge 42 that defines the shape or boundary of the cross-section of the monocrystalline body 30 that is formed as the molten surface solidifies. All of the drawings in the reference show the diameter of the polycrystalline feed and monocrystalline product are approximately the same. The function of the holes 46 in the heater 20 or any holes in shaper 40 is to allow flow of molten material between the polycrystalline rod side and the monocrystalline body side of the heater. The size of those holes do not define the diameter of the monocrystalline body product. The Examiner will note that regardless of the number of holes in the shaper, only a single monocrystalline product was obtained rather than a plurality of products (as would result if the size of the holes defined the size of the product). The polycrystalline feed rods disclosed in the reference were 6 mm in diameter (column 9, lines 57-58) and accordingly, the monocrystalline product in Kou was clearly greater than 3 mm in diameter.

In addition to the foregoing, it should be noted that Kou indicates that no single crystal seeds are required only in the case that one is growing single crystals of NaNO_3 (column 10, lines 19-21) and there is no suggestion that the seeds can be eliminated with respect to any other crystal. It should also be noted that NaNO_3 is a nitrate and not an oxide.

In light of the foregoing, it is clear that the Kou reference neither anticipates nor renders the claimed invention obvious.

The Cordova-Plaza or Kobayashi have been cited only to show that the Laser Heated Pedestal Growth Method exists. They are not asserted to, nor in fact do they, cure the basic deficiencies in Kou. The combination, accordingly, cannot render the claimed invention obvious.

Application No. 10/066,920

Docket No.: M1071.1539/P1539

It is respectfully submitted that this application is now in condition to be allowed and the early issuance of a Notice of Allowance is respectfully requested.

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Respectfully submitted,

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